

SEQUENCE LISTING

(1) GENERAL INFORMATION:

- (i) APPLICANT: Chatterjee, Deb K.
- (ii) TITLE OF INVENTION: Mutant DNA Polymerases and Uses Thereof

(iii) NUMBER OF SEQUENCES: 43

(iv) CORRESPONDENCE ADDRESS:

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- (E) COUNTRY: USA
- (F) ZIP: 20005

(v) COMPUTER READABLE FORM:

- (A) MEDIUM TYPE: Floppy disk
- (B) COMPUTER: IBM PC compatible
- (C) OPERATING SYSTEM: PC-DOS/MS-DOS
- (D) SOFTWARE: PatentIn Release #1.0, Version #1.30

(vi) CURRENT APPLICATION DATA:

- (A) APPLICATION NUMBER: (To Be Assigned)
- (B) FILING DATE: (Herewith)
- (C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: US 08/525,057
- (B) FILING DATE: 08-SEP-1995

(viii) PRIOR APPLICATION DATA:

- (A) APPLICATION NUMBER: US 08/537,397
- (B) FILING DATE: 02-OCT-1995

(ix) ATTORNEY/AGENT INFORMATION:

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- (C) REFERENCE/DOCKET NUMBER: 0942.3600002

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(2) INFORMATION FOR SEQ ID NO:1:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 40 base pairs

09558424 - 0942600

- (B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

CAGGATCCAC ATGGTGCTTA ACGGCGACAT CCACACTAAG

40

(2) INFORMATION FOR SEQ ID NO:2:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 27 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

GTAAACTTCT TGTGCGGTCT CAATGAC

27

(2) INFORMATION FOR SEQ ID NO:3:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 11 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

Ala Lys Ala Ile Thr Phe Gly Ile Leu Tyr Gly  
1 5 10

(2) INFORMATION FOR SEQ ID NO:4:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 11 amino acids

- 0955542102600  
D
- (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Ala Lys Thr Phe Ile Tyr Gly Phe Leu Tyr Gly  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:5:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 11 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Ala Lys Thr Ile Asn Phe Gly Val Leu Tyr Gly  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:6:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 11 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Ala Lys Ala Ile Asn Phe Gly Leu Ile Tyr Gly  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:7:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 4 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Thr Phe Ile Tyr  
1

(2) INFORMATION FOR SEQ ID NO:8:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 4 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:

Ala Ile Thr Phe  
1

(2) INFORMATION FOR SEQ ID NO:9:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 4 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: peptide

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Thr Ile Asn Phe  
1

(2) INFORMATION FOR SEQ ID NO:10:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 45 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

TCAGGGCTGCT AAAACATTCA TCTACGGTAT ACTGTATGGT TCTGG

45

(2) INFORMATION FOR SEQ ID NO:11:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 33 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

GTAGAGGACC CCGTAATTAA TGGTCTTGGC CGC

33

(2) INFORMATION FOR SEQ ID NO:12:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 11 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly  
1 5 10

(2) INFORMATION FOR SEQ ID NO:13:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 4 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Met Val Asn Phe  
1

(2) INFORMATION FOR SEQ ID NO:14:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 694 base pairs
  - (B) TYPE: nucleic acid
  - (C) STRANDEDNESS: double
  - (D) TOPOLOGY: both

(ii) MOLECULE TYPE: DNA (genomic)

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 2..694

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

G GAT CCA GAC TGG TGG ATC GTC AGT GCG GAT TAT TCC CAA ATA GAA	46
Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu	
1 5 10 15	
CTC AGA ATC CTC GCT CAT CTC AGT GGT GAT GAG AAC CTT GTG AAG GCC	94
Leu Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala	
20 25 30	
TTC GAG GAG GGC ATC GAT GTG CAC ACC TTG ACT GCC TCC AGG ATC TAC	142
Phe Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr	
35 40 45	
AAC GTA AAG CCA GAA GAA GTG AAC GAA GAA ATG CGA CGG GTT GGA AAG	190
Asn Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys	
50 55 60	

D9556421 - 042600

ATG GTG AAC TTC TCT ATA ATA TAC GGT GTC ACA CCG TAC GGT CTT TCT Met Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser 65                   70                   75	238
GTG AGA CTT GGA ATA CCG GTT AAA GAA GCA GAA AAG ATG ATT ATC AGC Val Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser 80                   85                   90                   95	286
TAT TTC ACA CTG TAT CCA AAG GTG CGA AGC TAC ATC CAG CAG GTT GTT Tyr Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val 100               105               110	334
GCA GAG GCA AAA GAG AAG GGC TAC GTC AGG ACT CTC TTT GGA AGA AAA Ala Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys 115               120               125	382
AGA GAT ATT CCC CAG CTC ATG GCA AGG GAC AAG AAC ACC CAG TCC GAA Arg Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu 130               135               140	430
GGC GAA AGA ATC GCA ATA AAC ACC CCC ATT CAG GGA ACT GCG GCA GAT Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp 145               150               155	478
ATA ATA AAA TTG GCT ATG ATA GAT ATA GAC GAG GAG CTG AGA AAA AGA Ile Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg 160               165               170               175	526
AAC ATG AAA TCC AGA ATG ATC ATT CAG GTT CAT GAC GAA CTG GTC TTC Asn Met Lys Ser Arg Met Ile Ile Gln Val His Asp Glu Leu Val Phe 180               185               190	574
GAG GTT CCC GAT GAG GAA AAA GAA GAA CTA GTT GAT CTG GTG AAG AAC Glu Val Pro Asp Glu Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn 195               200               205	622
AAA ATG ACA AAT GTG GTG AAA CTC TCT GTG CCT CTT GAG GTT GAC ATA Lys Met Thr Asn Val Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile 210               215               220	670
AGC ATC GGA AAA AGC TGG TCT TGA Ser Ile Gly Lys Ser Trp Ser 225               230	694

(2) INFORMATION FOR SEQ ID NO:15:

- (i) SEQUENCE CHARACTERISTICS:
  - (A) LENGTH: 230 amino acids
  - (B) TYPE: amino acid
  - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu  
1 5 10 15

Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe  
20 25 30

Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn  
35 40 45

Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met  
50 55 60

Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val  
65 70 75 80

Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr  
85 90 95

Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala  
100 105 110

Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg  
115 120 125

Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly  
130 135 140

Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile  
145 150 155 160

Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn  
165 170 175

Met Lys Ser Arg Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu  
180 185 190

Val Pro Asp Glu Glu Lys Glu Leu Val Asp Leu Val Lys Asn Lys  
195 200 205

Met Thr Asn Val Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser  
210 215 220

Ile Gly Lys Ser Trp Ser  
225 230

(2) INFORMATION FOR SEQ ID NO:16:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 31 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

GTATATTATA GAGTAGTTAA CCATCTTCC A

31

(2) INFORMATION FOR SEQ ID NO:17:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 26 base pairs  
(B) TYPE: nucleic acid  
(C) STRANDEDNESS: both  
(D) TOPOLOGY: both

(ii) MOLECULE TYPE: cDNA

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

GACGTTCAA GCGCTAGGGC AAAAGA

26

(2) INFORMATION FOR SEQ ID NO:18:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 11 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly  
1 5 10

(2) INFORMATION FOR SEQ ID NO:19:

D 9 5 5 8 4 2 4 . 0 4 2 6 0 0

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 24 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

Gly Ser Arg Leu Val Asp Arg Gln Cys Gly Leu Phe Pro Asn Arg Thr  
1                   5                           10                           15  
  
Gln Asn Pro Arg Ser Ser Gln Trp  
20

(2) INFORMATION FOR SEQ ID NO:20:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 60 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Glu Pro Cys Glu Gly Leu Arg Gly Gly His Arg Cys Ala His Leu Asp  
1               5                           10                           15  
  
Cys Leu Gln Asp Leu Gln Arg Lys Ala Arg Arg Ser Glu Arg Arg Asn  
20               25                           30  
  
Ala Thr Gly Trp Lys Asp Gly Glu Leu Leu Tyr Asn Ile Arg Cys His  
35               40                           45  
  
Thr Val Arg Ser Phe Cys Glu Thr Trp Asn Thr Gly  
50               55                           60

(2) INFORMATION FOR SEQ ID NO:21:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 99 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single

(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

Arg Ser Arg Lys Asp Asp Tyr Gln Leu Phe His Thr Val Ser Lys Gly  
1 5 10 15

Ala Lys Leu His Pro Ala Gly Cys Cys Arg Gly Lys Arg Glu Gly Leu  
20 25 30

Arg Gln Asp Ser Leu Trp Lys Lys Lys Arg Tyr Ser Pro Ala His Gly  
35 40 45

Lys Gly Gln Glu His Pro Val Arg Arg Arg Lys Asn Arg Asn Lys His  
50 55 60

Tyr Arg Arg Gly Ala Glu Lys Lys Lys His Glu Ile Gln Asn Asp His  
85 90 95

Ser Gly Ser

(2) INFORMATION FOR SEQ ID NO:22:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 8 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

Arg Thr Gly Leu Arg Gly Ser Arg  
1 5

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 6 amino acids

- (B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Gly Lys Arg Arg Thr Ser  
1 5

(2) INFORMATION FOR SEQ ID NO:24:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 16 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Ser Gly Glu Glu Gln Asn Asp Lys Cys Gly Glu Thr Leu Cys Ala Ser  
1 5 10 15

(2) INFORMATION FOR SEQ ID NO:25:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 9 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

His Lys His Arg Lys Lys Leu Val Leu  
1 5

(2) INFORMATION FOR SEQ ID NO:26:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 13 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

Ile Gln Thr Gly Gly Ser Ser Val Arg Ile Ile Pro Lys  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:27:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 14 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Asn Ser Glu Ser Ser Leu Ile Ser Val Val Met Arg Thr Leu  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:28:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 11 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

Arg Pro Ser Arg Arg Ala Ser Met Cys Thr Pro  
1               5                           10

(2) INFORMATION FOR SEQ ID NO:29:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 7 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant
- (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Leu Pro Pro Gly Ser Thr Thr  
1 5

(2) INFORMATION FOR SEQ ID NO:30:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 4 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

Ser Gln Lys Lys  
1

(2) INFORMATION FOR SEQ ID NO:31:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 10 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Thr Lys Lys Cys Asp Gly Leu Glu Arg Trp  
1 5 10

(2) INFORMATION FOR SEQ ID NO:32:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 10 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

Tyr Thr Val Ser His Arg Thr Val Phe Leu  
1 5 10

(2) INFORMATION FOR SEQ ID NO:33:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 11 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

Asp Leu Glu Tyr Arg Leu Lys Lys Gln Lys Arg  
1 5 10

(2) INFORMATION FOR SEQ ID NO:34:

- (i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 56 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

Leu Ser Ala Ile Ser His Gly Ile Gln Arg Cys Glu Ala Thr Ser Ser

1                   5                   10                   15  
Arg Leu Leu Gln Arg Gln Lys Arg Arg Ala Thr Ser Gly Leu Ser Leu  
                 20                   25                   30  
  
Glu Glu Lys Glu Ile Phe Pro Ser Ser Trp Gln Gly Thr Arg Thr Pro  
                 35                   40                   45  
  
Ser Pro Lys Ala Lys Glu Ser Gln  
                 50                   55

(2) INFORMATION FOR SEQ ID NO:35:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 10 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant
- (ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

Thr Pro Pro Phe Arg Glu Leu Arg Gln Ile  
1                   5                   10

(2) INFORMATION FOR SEQ ID NO:36:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 4 amino acids  
(B) TYPE: amino acid  
(C) STRANDEDNESS: single  
(D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

Glu Lys Glu Thr  
1

(2) INFORMATION FOR SEQ ID NO:37:

- (i) SEQUENCE CHARACTERISTICS:  
(A) LENGTH: 19 amino acids  
(B) TYPE: amino acid

- (C) STRANDEDNESS: single  
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

Ser Phe Arg Phe Met Thr Asn Trp Ser Ser Arg Phe Pro Met Arg Lys  
1                   5                   10                   15  
Lys Lys Asn

(2) INFORMATION FOR SEQ ID NO:38:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 9 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

Asn Ser Leu Cys Leu Leu Arg Leu Thr  
1                   5

(2) INFORMATION FOR SEQ ID NO:39:

- (i) SEQUENCE CHARACTERISTICS:  
 (A) LENGTH: 7 amino acids  
 (B) TYPE: amino acid  
 (C) STRANDEDNESS: single  
 (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

Ala Ser Glu Lys Ala Gly Leu  
1                   5

(2) INFORMATION FOR SEQ ID NO:40:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser  
1 5 10

(2) INFORMATION FOR SEQ ID NO:41:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

Pro Tyr Phe Ala Phe Asp Thr Glu Thr Asp Ser  
1 5 10

(2) INFORMATION FOR SEQ ID NO:42:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: amino acid
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

Gly Pro Val Ala Phe Asp Ser Glu Thr Ser Ala  
1 5 10

(2) INFORMATION FOR SEQ ID NO:43:

(i) SEQUENCE CHARACTERISTICS:

- CHARACTERISTICS:**

  - (A) LENGTH: 10 amino acids
  - (B) TYPE: amino acid
  - (C) STRANDEDNESS: single
  - (D) TOPOLOGY: not relevant

(ii) MOLECULE TYPE: protein

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

Met Ile Val Ser Asp Ile Glu Ala Asn Ala  
 1                   5                   10

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